REMARKS

Claims 1-12 are presented for examination, with Claims 8-12 being currently amended on the same date of filing the notice of appeal to place the claims in better form for consideration on appeal in accordance with C.F.R. § 1.116 (b) (2). Claims 1-7 are as previously pending.

The Office Action objected to Claims 8-12 because the claims as written could reasonably be interpreted as reciting a temperature at which the poor solvent begins before being adjusted to the claimed range, although the application as a whole suggests that the temperature ranges are intended to represent a final temperature of the poor solvent. Claims 8-12 are amended to correct these grammatical informalities objected to by the Office Action such that the claims conform to the language of Claim 1, from which they depend. Support for the amendments is found in Claim 1 and on page 9 of the specification. The amendments are not intended to limit the scope of the invention. No new matter is added by the amendments. Entry is requested.

35 U.S.C. § 103(a) obviousness rejection

The Office Action rejected Claims 1-2 and 5-6 as being unpatentable over "Aromatic Polyimide Nano-spheres Prepared by Reprecipitation Method," Polymer Preprints 2001; 50(3), Abstract (Suzuki *et al.*), in view of "Solution properties of poly(amic acid)-NMP containing LiCl and their effects on membrane morphologies," J. of Membrane Sci. 2002; 196: 257-77 (Lee *et al.*), as evidenced by U.S. 6,187,899 (Asao *et al.*). The Office Action also rejected Claims 3-4, 7, and 10-12 as being unpatentable over Suzuki *et al.*, in view of Lee *et al.*, and further in view of Asao *et al.*

The rejections are traversed because Suzuki *et al.* does not teach or provide any suggestion or motivation to make the claimed temperature range of -20° C to 60° C. Instead, Suzuki *et al.* teaches in Fig. 2 that the particle size of the nano-spheres increases simply along the *concentration* of the poured solvent. *See* Suzuki *et al.* at ¶ 3. Although the reference teaches that PPA nano-spheres changed by temperature of the poor solution at around 20°C, this single data point cannot render obvious the entire claimed range of -20°C to 60°. In contrast, the criticality of the claimed temperature and particle size is closely connected. *See* ¶ [0021]. When the temperature of the poor solvent is lower than 30° C, the particle size of the porous polyamide acid microparticles tends to become large, forming a size 10000 nm by maximum. Example 6 of the specification discloses that 0.1 ml of the prepared polymer solution is poured into 10 ml of cyclohexane using a microsyringe under stirring condition of 1500 rpm at (a) 20° C, (b) 40° C, and (c) by the same condition in the Examples where 0.1 ml of the solution whose blending ratio of LiCl to polyamide acid is at 60 mass % is added to 10 ml of cyclohexane at 60° C. *See* ¶ [0034]. Therefore, when the porous polyamide acid microparticles are prepared at a higher temperature, the particle size and pore size become smaller, and the minimum values are respectively around 50 nm and 20 nm as shown by Fig. 5. These differences in particle size based on *temperature* are not taught or suggested by Suzuki *et al.* even though a change in particle size based on *concentration* of the poured solution is taught by the reference.

The secondary reference, Lee *et al.*, which was cited by applicants in the background section of the instant specification (¶ [0005] of publication), teaches away from the invention. Lee *et al.* teaches that if **3 weight %** of LiCl is added during the preparation of a polyimide

porous membrane, *macrovoids are formed* (page 275, line 8) but that if **5 weight %** of LiCl is added, the *membrane is completely macrovoid-free and has a sponge-like structure* (page 275, line 13). This contrasting teaching renders Lee *et al.* unsuitable for the intended purpose of making the claimed limitation of **0.5 to 80 weight %** of alkali metal salt because a 3 weight % of LiCl falls within the claimed range. Additionally, and despite the citation to Fig. 7, Lee *et al.* fails to teach the presently claimed pore sizes on the order of 20 to 500 nm, and porosity on the order of 0.1 % to 30%. The teaching that the structure is mechanically stronger relates to the lack of large macrovoid pores rather than an increase in fine pores. There is no hypothetical combination in Fig. 7 that discloses the claimed porosity and pore size. All Fig. 7 shows is a cross-section of a membrane with a legend of 100 μm, which is on a scale to measure the macrovoids of (a) and (b). To extrapolate from this that Fig. 7 teaches pore size on the order of 20 to 500 nm or porosity on the order of 0.1 % to 30% is purely speculative. It is far from clear, given the scale of the legend, that Lee *et al.* is concerned with pore sizes on the order of 500nm. The size of the fine pores is indeterminate. With respect to inherency, Fig. 7 fails to contain any objective measure for informing one of ordinary skill what is the pore size of the membrane, much less a specific percent basis of the range in porosity. Hence, one of ordinary skill would not have a reasonable basis to conclude that Lee *et al.* was, in fact, able to achieve the claimed pore size on the order of 20 to 500 nm or porosity on the order of 0.1 % to 30%. Finally, it is not taught that porosity and pore size are result effective variables. Lee *et al.* teaches that the lack of macrovoids is optimal for producing a mechanically strong structure. There is no teaching that a lack of macrovoids also leads to optimization of porosity and pore size of the fine pores.

Asao *et al.* teaches away from the claimed invention. The reference teaches that the temperature at which a second step is carried out is not particularly restricted, but rather that the frequency of ultrasonic waves is set to control the particle diameter (col. 4, lines 48-54). The present invention, however, teaches that the temperature of the poor solvent is a critical factor affecting particle size.

Conclusion

In light of the foregoing, it is submitted that the application is now in condition for allowance. It is therefore respectfully requested that the rejection(s) be withdrawn and the application passed to issue.

Respectfully submitted,
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